

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

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Issue Date

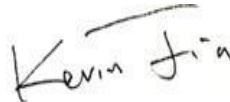
2021/4/27

Prepared By



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Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.0

T8 Four-Foot Linear Replacement Lamps Internal Driver/Line Voltage (UL Type B) Lamps				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm)	IES LM-79-2008	2000		1856
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		166.2
Beam Angle	IES LM-79-2008	≥ 160		195.2
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	16.82%
			277V	19.54%
Power Factor	ANSI C82.77:2014	0.9	120V	0.985
			277V	0.923
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1795
				1837
				1816
				1807
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		163.18
				168.53
				171.81
				164.87
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045 $\pm$ 175	3012
		7 step	3465 $\pm$ 245	3454
		7 step	3985 $\pm$ 275	3940
		7 step	5029 $\pm$ 355	5034
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥ 70		83
				83
				82
				84
Minimum R9	IES LM-79-2008 CIE 13.3-1995	≥ 0		5
				6
				5
				10
Minimum Rf	ANSI/IES TM-30-18	≥ 70		85
				84
				84
				84
Minimum Rg	ANSI/IES TM-30-18	≥ 89		95
				95
				95
				96
IES Rcs,h1	ANSI/IES TM-30-18	$-12\% \leq \text{IES Rcs,h1} \leq +23\%$		-11%
				-12%
				-12%
				-12%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/4/22	L48T8/830/12G-ID DE(-aa)	C1
			L48T8/835/12G-ID DE(-aa)	C2
			L48T8/840/12G-ID DE(-aa)	C3
			L48T8/850/12G-ID DE(-aa)	C4
2	Goniophotometer Test	2021/4/22	L48T8/830/12G-ID DE(-aa)	C1
3	THD and PF Test	2021/4/22	L48T8/830/12G-ID DE(-aa)	C1

Remark(If any)

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- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: L48T8/830/12G-ID DE(-aa)

Electrical Specification: 120-277V,60HZ

Fixture:

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L48T8/830/12G-ID DE(-aa)	Sample ID.	C1
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.05	60	0.093	11.0	0.985

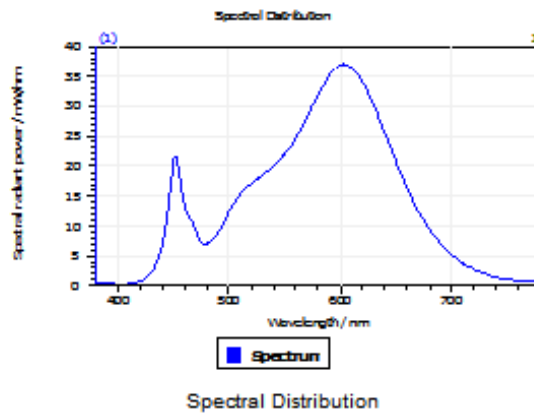
Test Result

CCT (K)	CRI	R9	Duv	THD
3012	83	5	0.00019	16.82%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
85	95	-11%	1795	163.18

4.1 Integrating Sphere Test

Results



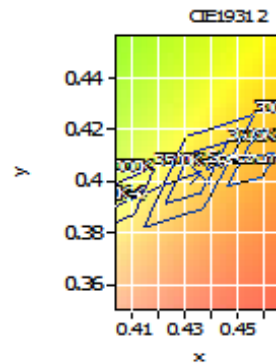
Spectral values

DominantWavelength	582.84 nm
Purity	0.518
PeakWavelength	603.27 nm
Radiant Power	5.422 W
Width50%:	
Luminous Flux	1.795 lm

Color Coordinates

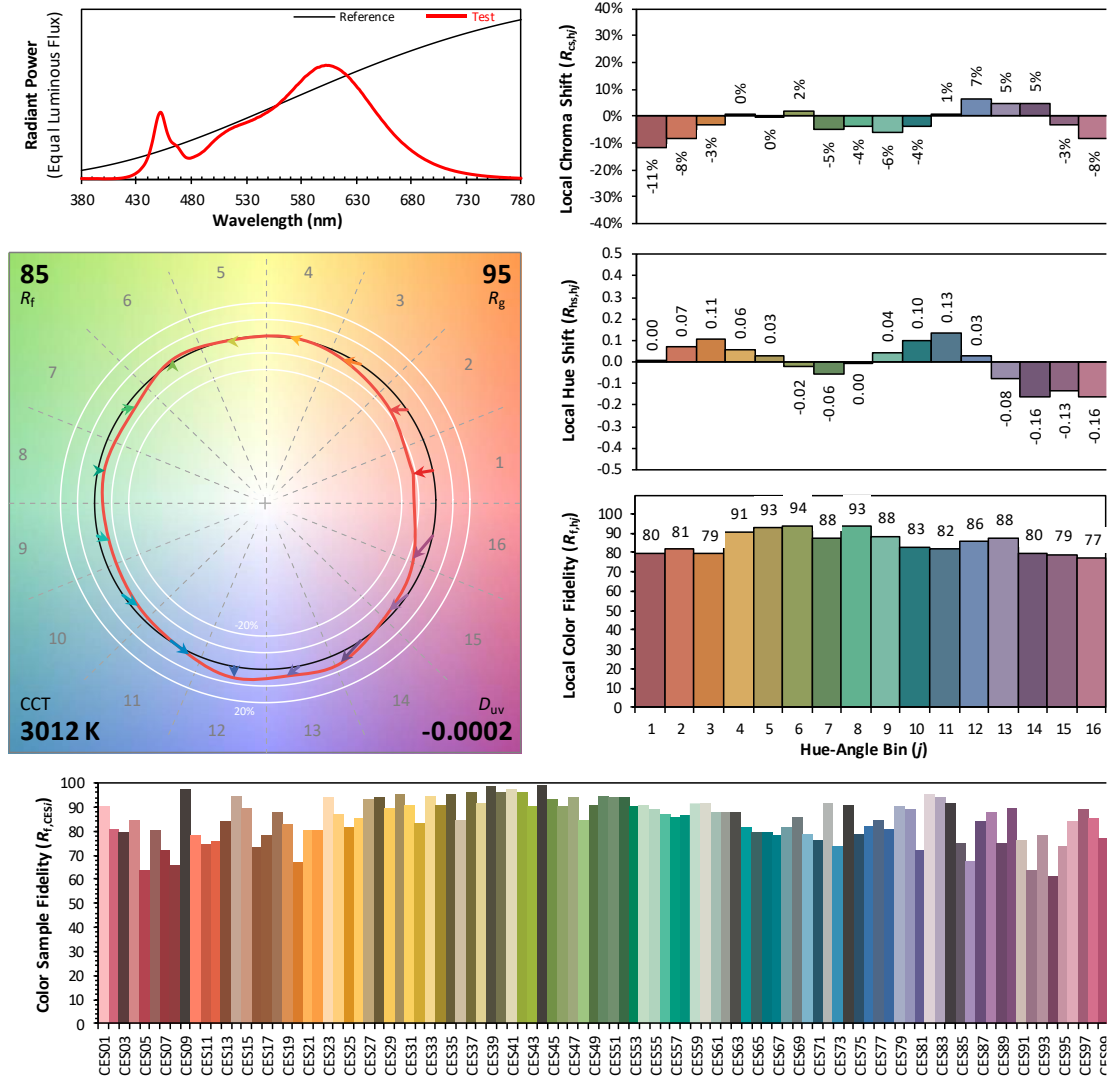
Correlated Color Temp		3012 K
x: 0.4358	u: 0.2502	u': 0.2502
y: 0.4032	v: 0.3473	v': 0.5209
CRI01	81.2	CRI09
CRI02	91.7	CRI10
CRI03	95.4	CRI11
CRI04	80.7	CRI12
CRI05	81.9	CRI13
CRI06	90.6	CRI14
CRI07	81.6	CRI15
CRI08	57.5	CRI16

ResultsCRI 82.6



PlanckDistance 1.9E-004

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4358
 y 0.4032
 u' 0.2502
 v' 0.5209

CIE 13.3-1995
 (CRI)

R_a 83

R_g 6

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3500K

Model No.	L48T8/835/12G-ID DE(-aa)	Sample ID.	C2
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.092	10.9	0.985

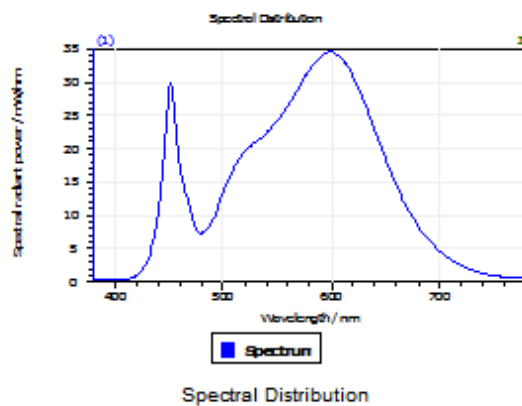
Test Result

CCT (K)	CRI	R9	Duv	THD
3454	83	6	0.00031	16.80%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	95	-12%	1837	168.53

4.1 Integrating Sphere Test

Results

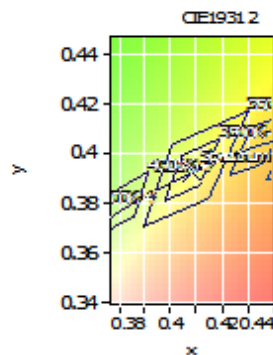


Spectral values

DominantWavelength	580.92 nm
Purity	0.405
PeakWavelength	598.71 nm
Radiant Power	5.51 W
Width50%:	
Luminous Flux	1.837 klm

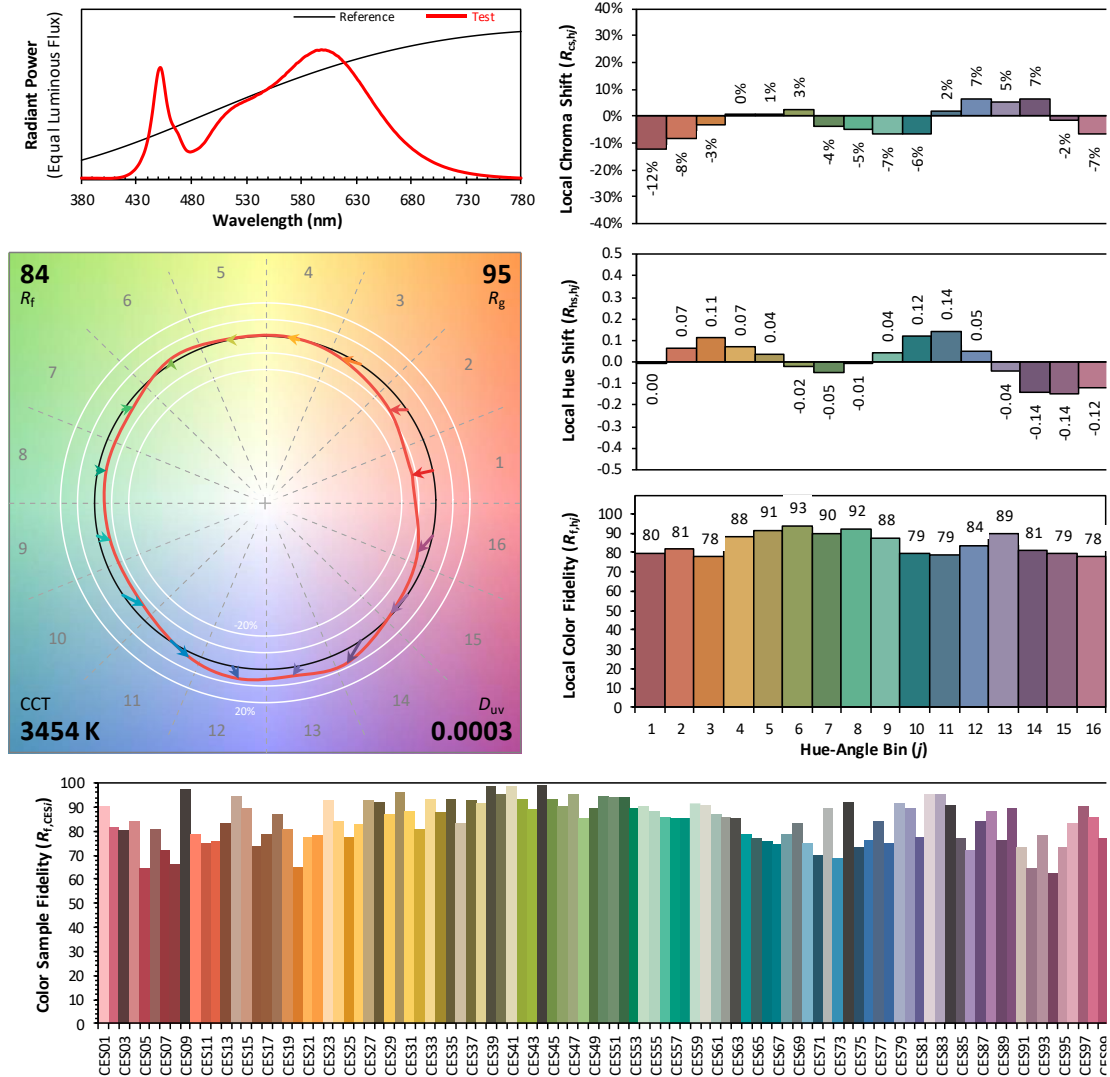
Color Coordinates

Correlated Color Temporal		3454 K
x: 0.4083	u: 0.2367	u': 0.2367
y: 0.3929	v: 0.3417	v': 0.5126
CRI01	80.7	CRI09
CRI02	89.7	CRI10
CRI03	96.1	CRI11
CRI04	81.2	CRI12
CRI05	81.0	CRI13
CRI06	86.5	CRI14
CRI07	84.3	CRI15
CRI08	61.1	CRI16
ResultsCRI	82.6	



PlankDistance 3.1E-004

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4083
 y 0.3929
 u' 0.2367
 v' 0.5126

CIE 13.3-1995
 (CRI)

R_a 83

R_g 6

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 4000K

Model No.	L48T8/840/12G-ID DE(-aa)	Sample ID.	C3
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.089	10.6	0.984

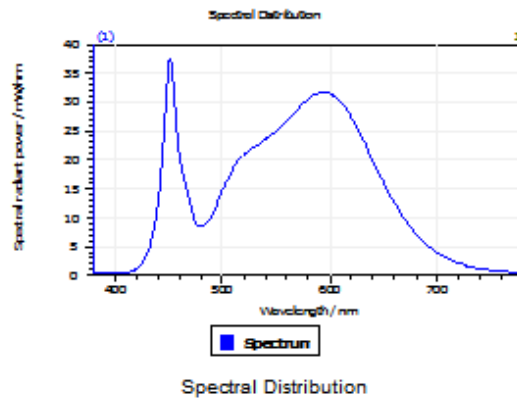
Test Result

CCT (K)	CRI	R9	Duv	THD
3940	82	5	0.00071	16.97%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	95	-12%	1816	171.81

4.1 Integrating Sphere Test

Results

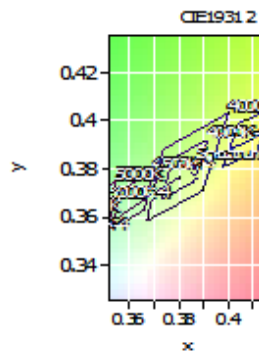


Spectral values

DominantWavelength	578.93 nm
Purity	0.293
PeakWavelength	451.41 nm
Radiant Power	5.473 W
Width50%:	
Luminous Flux	1.816 klm

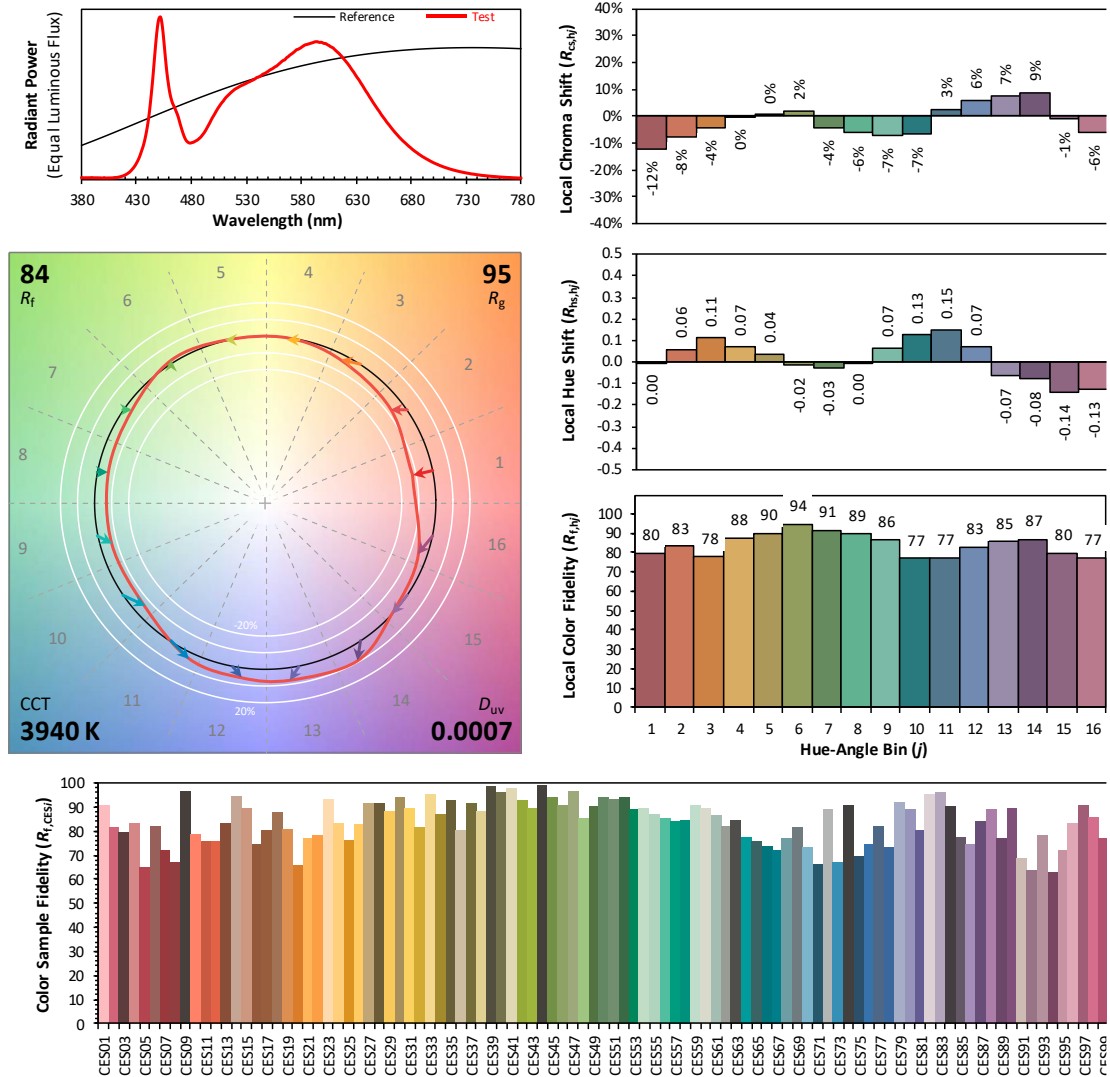
Color Coordinates

Correlated Color Temperat		3940 K
x: 0.3837	u: 0.2258	u': 0.2258
y: 0.3803	v: 0.3357	v': 0.5036
CRI01	80.4	CRI09
CRI02	89.1	CRI10
CRI03	95.0	CRI11
CRI04	80.9	CRI12
CRI05	80.8	CRI13
CRI06	85.4	CRI14
CRI07	85.0	CRI15
CRI08	62.4	CRI16
ResultsCRI	82.4	



PlanckDistance 7.1E-004

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3837
 y 0.3803
 u' 0.2258
 v' 0.5036

CIE 13.3-1995
 (CRI)

R_a 83

R_g 7

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L48T8/850/12G-ID DE(-aa)	Sample ID.	C4
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.03	60	0.093	11.0	0.984

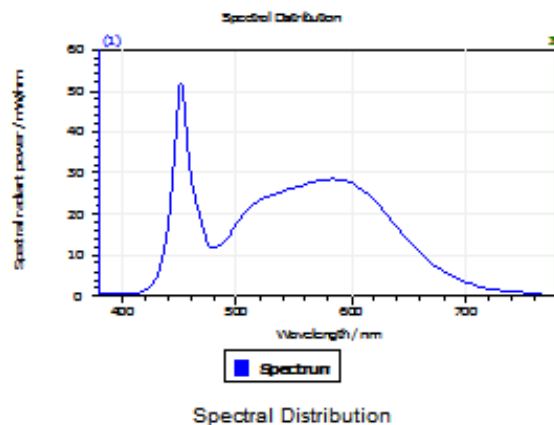
Test Result

CCT (K)	CRI	R9	Duv	THD
5034	84	10	0.0018	17.10%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	96	-12%	1807	164.87

4.1 Integrating Sphere Test

Results

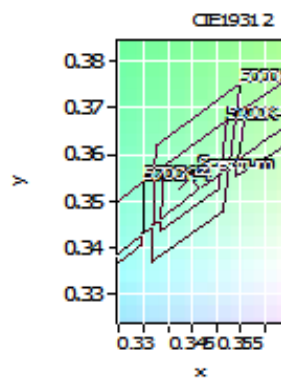


Spectral values

DominantWavelength	570.43 nm
Purity	0.098
PeakWavelength	451.57 nm
Radiant Power	5.639 W
Width50%:	
Luminous Flux	1.807 klm

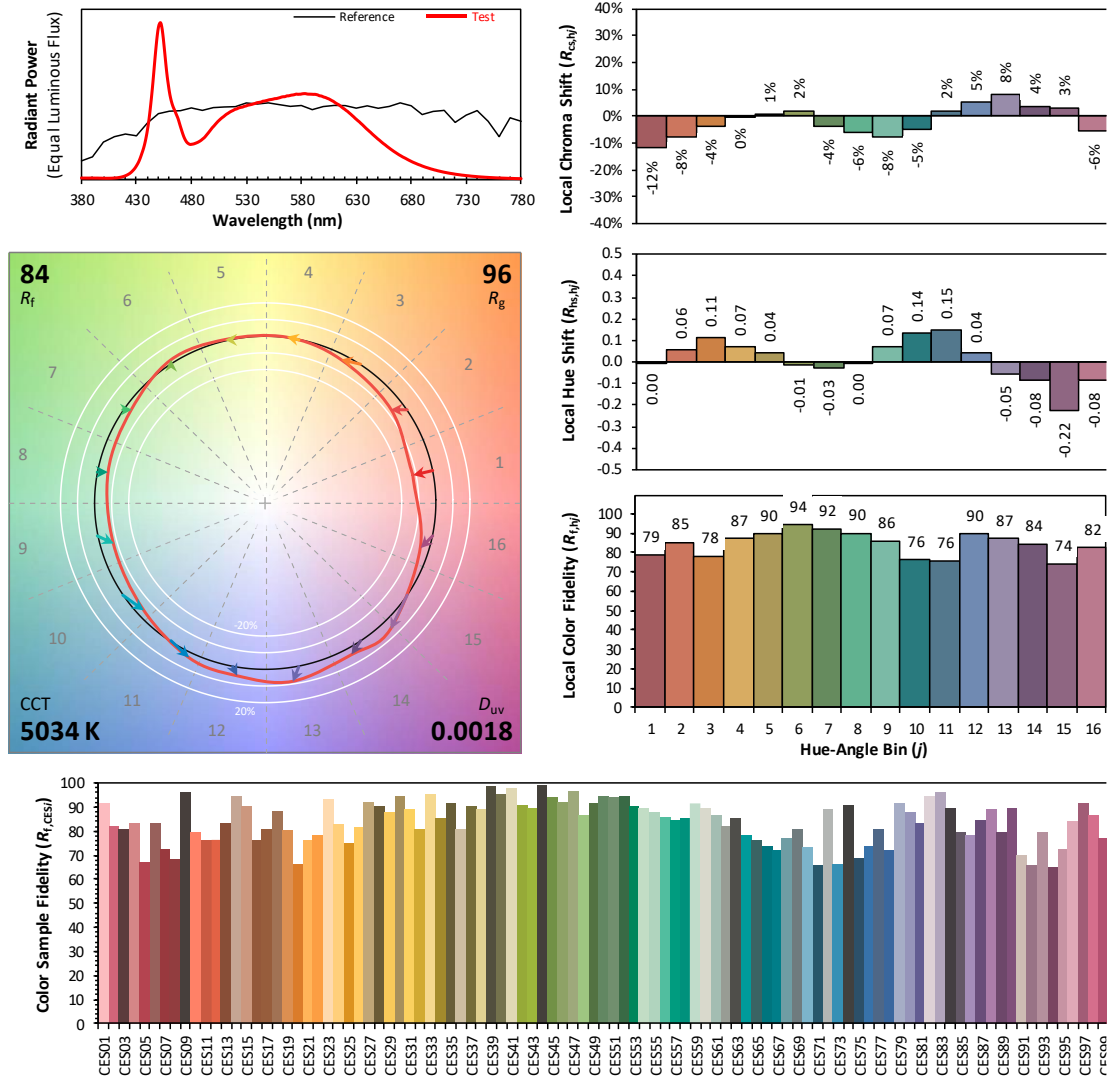
Color Coordinates

Correlated Color Temperat		5034 K
x: 0.3445	u: 0.2098	u': 0.2098
y: 0.3548	v: 0.3241	v': 0.4861
CRI01	82.0	CRI09
CRI02	89.3	CRI10
CRI03	93.6	CRI11
CRI04	82.9	CRI12
CRI05	82.7	CRI13
CRI06	84.7	CRI14
CRI07	86.6	CRI15
CRI08	67.2	CRI16
ResultsCRI	83.6	



PlanckDistance 1.8E-003

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3445
 y 0.3548
 u' 0.2098
 v' 0.4861

CIE 13.3-1995
 (CRI)

R_a 84

R_g 11

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L48T8/830/12G-ID DE(-aa)	Sample ID.	C1
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

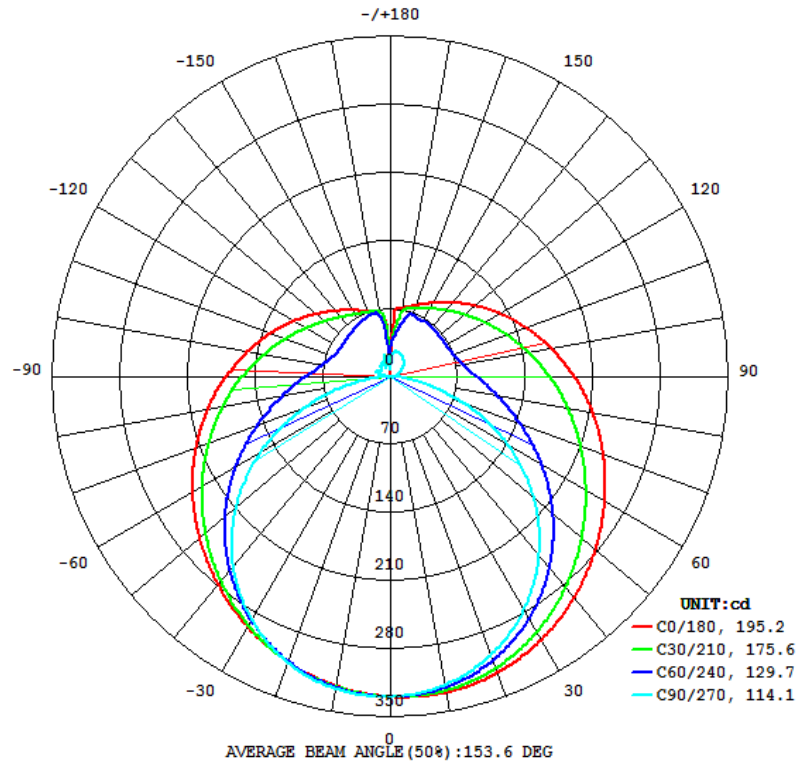
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	277.02	60	0.044	11.2	0.911

Test Result

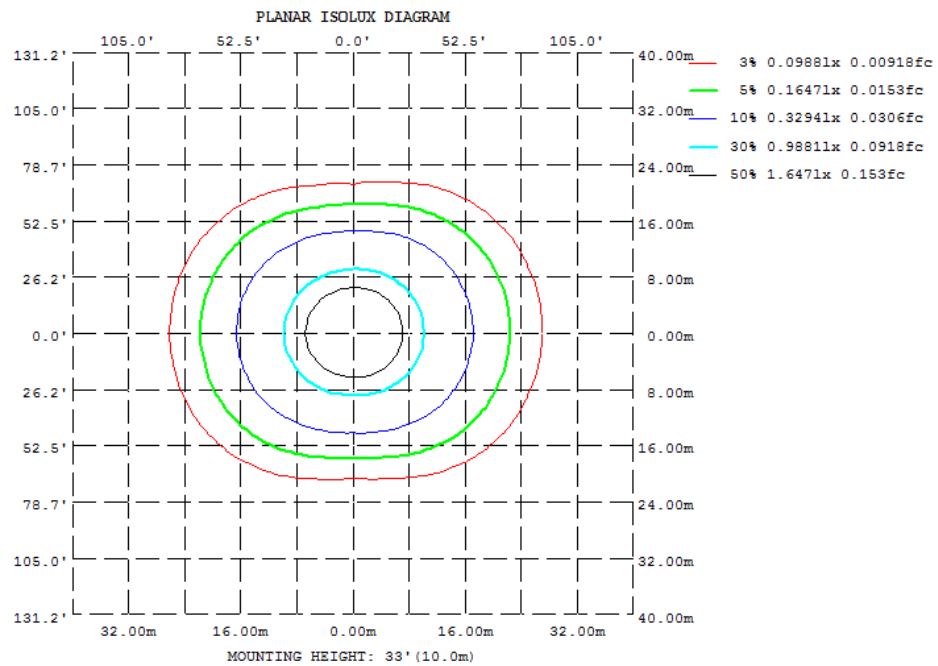
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1856	166.2	195.2

4.2 Goniophotometer Test

Zonal Lumen Summary



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	329.9	326.2	321.9	321.4	323.2	324.3	326.2	329.1
20	324.0	314.7	304.5	306.3	312.1	311.7	312.5	320.9
30	312.4	295.6	277.0	285.2	296.8	292.2	288.3	304.9
40	296.4	270.3	240.0	259.6	278.3	267.0	253.5	282.5
50	277.4	241.1	194.4	231.4	258.0	238.5	208.9	255.6
60	256.7	210.9	141.1	202.5	236.5	208.4	155.8	226.7
70	235.0	182.1	82.84	174.8	214.4	179.2	96.28	198.2
80	212.9	156.6	27.48	150.0	192.4	152.4	37.53	171.9
90	191.0	135.1	0.4069	128.5	171.2	128.8	0.9943	148.9
100	169.9	117.5	1.797	110.6	151.2	109.6	4.926	129.2
110	149.9	103.7	7.456	96.29	132.6	94.58	16.14	113.2
120	131.4	93.04	13.09	85.54	115.9	83.65	13.32	100.2
130	114.7	85.14	19.19	77.92	101.2	76.32	11.65	90.18
140	100.2	79.45	22.97	72.86	89.02	71.82	16.03	82.74
150	88.03	75.32	26.23	69.82	79.34	69.73	18.35	76.75
160	78.53	72.15	27.37	68.40	72.61	69.20	20.22	69.94
170	72.16	57.04	26.36	64.05	68.48	67.61	17.63	54.53
180	8.402	12.11	17.79	15.73	7.828	11.14	16.82	15.64
DEG	LUMINOUS INTENSITY:cd							

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L48T8/830/12G-ID DE(-aa)	Sample ID.	C1
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.05	60	0.093	11.0	0.985	16.82%
277.02	60	0.044	11.2	0.923	19.54%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

***** End of Test Report*****